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Year-to-year variations of rainfall totals in Scotland.

1. Introduction.

Memorandum No.XXXI, issued in July 1960, discussed rainfall variations for periods of 1, 2, 3, 4, 5 and 6 months for areas in England and Wales. Similar figures for Scotland were urgently required for inclusion in the new edition of M.A.F.F. Bulletin No.138.

2. Data used.

Time did not permit the use of a large sample of stations. The following records of monthly rainfall were made readily available by Meteorological office, Edinburgh:-

Station.	Annual Rainfall Average (1916-50)	Period.
Edinburgh	27.5	1901 - 1950
Aberdeen	30.5	1897 - 1946
Kilmarnock	43.5	1911 - 1960
Arisaig	64.0	1911 - 1960

3. Method.

Only the months April to September and consecutive combinations thereof were considered. The methods described in Mem. No. XXXI were used but because of the small sample, the results contained irregularities in the pattern. Furthermore the pattern of variation for the eastern stations was significantly different from that of Kilmarnock and Arisaig in the west.

The two pairs of stations were therefore treated separately. The arithmetical results were plotted on a graph showing percentage of average against length of period in months. Smooth curves were drawn through the percentages of the mean driest month, the mean next driest and so on.

4. Results.

Table 1 Eastern Scotland.

Sample Percentages of Rainfall Average.

(April to September only)

Period	1	2	3	4	5	6	7	8	9	10
6 months	67	78	84	90	95	101	107	114	122	142
5 months	65	77	83	90	95	101	107	114	124	144
4 months	62	74	81	89	95	101	108	116	127	147
3 months	54	68	79	87	95	101	109	118	132	157
2 months	45	61	74	84	93	101	110	122	138	172
1 month	31	50	62	74	86	98	111	129	152	207

Table 2 Western Scotland.

Sample Percentages of Rainfall Average.

(April to September only)

Period	1	2	3	4	5	6	7	8	9	10
6 months	76	83	88	92	96	101	105	110	116	133
5 months	74	82	87	92	96	101	106	111	117	134
4 months	70	81	86	91	95	101	106	113	120	137
3 months	63	76	82	89	95	101	107	116	126	145
2 months	53	69	78	85	94	101	109	121	133	157
1 month	37	59	70	79	91	102	114	127	143	178

5. Comments.

It is now possible to get a clearer picture of the changes in the variation pattern of summer rainfall over Britain.

Table 3.

Comparison of the mean lowest rainfall, expressed as a percentage of average, experienced 1 year in 10 during the months April to September.

Area	Length of Period in Months					
	1	2	3	4	5	6
West Scotland	37	53	63	70	74	76
East Scotland	31	45	54	62	65	67
North England and Wales	24½	44	53	58½	61	62½
South England and Wales	20½	39½	49	54	57½	58½

Table 4.

Comparison of the mean highest rainfall, expressed as a percentage of average experienced 1 year in 10 during the months April to September.

Area	Length of Period in Months.					
	1	2	3	4	5	6
West Scotland	178	157	145	137	134	133
East Scotland	207	172	157	147	144	142
North England and Wales	205	172	159	152½	146	144
South England and Wales	206½	174	159½	153	147½	144

The changes in the magnitude of the "driest period in 10 years" from area to area are quite definite and indicate a pronounced and not altogether unexpected patternof what might be called "liability to droughts".

On the other hand, Table 4 shows that, apart from West Scotland the liability to very wet periods relative to the average changes very little over most of Britain.

6. Extremes.

The observed extremes during the 50 years under review for the sample stations, expressed as percentages of the 50 year average, were as follows:-

Period	Edinburgh	Aberdeen.	Kilmarnock	Arisaig.
April	256 - 09	292 - 18	226 - 29	196 - 31
May	226 - 31	200 - 24	252 - 26	244 - 26
June	342 - 18	263 - 36	252 - 17	189 - 21
July	290 - 20	258 - 29	171 - 24	182 - 31
August	300 - 06	232 - 28	187 - 04	183 - 44
September	348 - 14	258 - 22	260 - 20	203 - 27
MEAN	294 - 16	250 - 26	225 - 20	200 - 30
April - May	192 - 34	212 - 42	215 - 48	166 - 51
June - July	187 - 36	175 - 41	173 - 49	156 - 50
August- September	273 - 27	208 - 41	198 - 26	178 - 37
MEAN	217 - 32	198 - 41	195 - 41	167 - 46
April - June	191 - 28	172 - 44	167 - 49	148 - 60
July - September	206 - 36	173 - 45	179 - 49	157 - 46

Period	Edinburgh	Aberdeen.	Kilmarnock	Arisaig.
April - July	162 - 55	150 - 57	152 - 63	132 - 73
June - September	197 - 53	155 - 56	177 - 59	155 - 60
April - August	165 - 57	146 - 62	149 - 69	129 - 79
April - September	157 - 61	142 - 58	156 - 71	138 - 70

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